



## Risk of respiratory and cardiovascular hospitalisation with exposure to bushfire particulates: New evidence from Darwin, Australia

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### Abstract:

The risk of hospitalisation from bushfire exposure events in Darwin, Australia, is examined. Several local studies have found evidence for the effects of exposure to bushfire particulates on respiratory and cardiovascular hospital admissions. They have characterised the risk of admission from seasonal exposures to biomass air pollution. A new, unanalysed data set presented an additional chance to examine unique exposure effects, as there are no anthropogenic sources of particulates in the vicinity of the exposure monitor. The incidence of daily counts of hospital admissions for respiratory and cardiovascular diagnoses was calculated with respect to exposures of particulate matter (PM(10)), coarse particulate matter, fine particulate matter (FPM) and black carbon composition. A Poisson model was used to calculate unadjusted (crude) measures of effect and then adjusted for known risk factors and confounders. The final model adjusted for the effects of minimum temperature, relative humidity, a smoothed spline for seasonal effects, 'date' for a linear effect over time, day of the week and public and school holidays. A subset analysis adjusted for an influenza epidemic in a particular year. The main findings suggest that respiratory admissions were associated with exposure to PM(10) with a lag of 1 day when adjusted for flu and other confounders (RR Euro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.025, 95 % CI 1.000-1.051,  $p < 0.05$ ). This effect is strongest for exposure to FPM concentrations (RR Euro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.091, 95 % CI 1.023-1.163,  $p < 0.01$ ) when adjusted for flu. Respiratory admissions were also associated with black carbon concentrations recorded the previous day (RR Euro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.0004, 95 % CI 1.000-1.0008,  $p < 0.05$ ), which did not change strength when adjusted for flu. Cardiovascular admissions had the strongest association with exposure to same-day PM and highest RR for exposure to FPM when adjusted for confounders (RR Euro Surveillance (Bulletin European Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.044, 95 % CI 0.989-1.102). Consistent risks were also found with exposure to black carbon with lags of 0-3 days.

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### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event

# Climate Change and Human Health Literature Portal

**Air Pollution:** Particulate Matter

**Extreme Weather Event:** Wildfires

**Geographic Feature:** ☒

resource focuses on specific type of geography

None or Unspecified

**Geographic Location:** ☒

resource focuses on specific location

Non-United States

**Non-United States:** Australasia

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Respiratory Effect

**Cardiovascular Effect:** Other Cardiovascular Effect

**Cardiovascular Disease (other):** emergency admissions with a principle diagnosis of any cardiovascular conditions, coded 390-459 (ICD-9)

**Respiratory Effect:** Other Respiratory Effect

**Respiratory Condition (other) :** emergency admissions with a principle diagnosis of any respiratory, coded 460-519 (ICD-9)

**Resource Type:** ☒

format or standard characteristic of resource

Research Article

**Timescale:** ☒

time period studied

Time Scale Unspecified